

Notice of Allowability

Application No.

10/603,438

Examiner

J. Derek Rutten

Applicant(s)

SHAYLOR ET AL.

Art Unit

2192

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 12/22/06 amendment.
2. ☒ The allowed claim(s) is/are 1, 2, 5-9, 12-16, and 19-21 (renumbered 1-15).
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.


Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____


TUAN DAM
SUPERVISORY PATENT EXAMINER

DETAILED ACTION

1. This action is in response to Applicant's submission filed 12/22/2006, responding to the 11/28/2006 Office action which detailed the rejection of claims 1-21. Claims 1, 8, and 15 have been amended, and claims 3, 4, 10, 11, 17 and 18 have been canceled. Claims 1, 2, 5-9, 12-16, and 19-21 remain pending in the application and have been fully considered by the examiner.

Response to Amendment/Arguments

2. The objection to the specification is withdrawn in light of the specification amendment.

3. The objection to the claims is withdrawn in light of the cancellation of claims 4, 11, and 18.

4. Applicant's arguments, see page 8, filed 12/22/2006, with respect to the rejection of claims 3, 10, and 17 under 35 U.S.C. § 103(a) have been fully considered and are persuasive. The limitations of claims 3, 10, and 17 (which have been canceled) have been incorporated into each of independent claims 1, 8, and 15. The rejections of claims 1-21 have been withdrawn.

EXAMINER'S AMENDMENT

5. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Shun Yao, Reg. No. 59,242 on 18 January 2007.

The application has been amended as follows:

--BEGIN EXAMINER'S AMENDMENT--

In the Specification:

Please add the following paragraphs ([0043]-[0045]) at the end of page 10, after paragraph [0042] of the specification:

Transformations for Exact Garbage Collection

[0043] The hard part of exact garbage collection in Java is identifying the pointers in activation frames and on the evaluation stack. The translator applies two transformations that make this significantly easier:

- Local variables are partitioned into pointer variables and non-pointer variables. This means that a single pointer map per method can describe which slots in an activation record are pointers. Note that this transformation comes for free as a result of the transformation applied to enable on-card verification
- The evaluation stack is made to be empty ("trimmed") before any instruction that may potentially result in an allocation (and therefore a GC). That is, all values on the stack except for the parameters and operands of the current instruction are spilled before the potentially allocating instruction is executed. The table below shows the list of bytecodes that require stack trimming as well as the reason they may cause an allocation.

Instruction	Reason
checkcast	object allocation
instanceof	object allocation
getstatic	invocation of <clinit> / initialization
putstatic	invocation of <clinit> / initialization
invoke*	invocation of <clinit> / initialization / object allocation
monitorenter / exit	invocation of <clinit>/initialization, context switch
newdimension	object allocation
newarray	object allocation
newobject	object allocation
clinit	invocation of <clinit> / initialization

[0044] Note that instructions whose only potential allocation related side effect is the exception object for a VM raised exception are not included above. This is because the current state of the evaluation stack is ignored during exception handling and so can be treated as empty should a GC occur when allocating an exception object.

[0045] Note also that these transformations only simplify exact GC in VM implementations where thread scheduling is under the explicit control of the VM and the VM ensures that context switching can only occur at one of the instructions listed in the above table.

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In the Claims:

Please amend claim 8 as follows:

After “comprising:” in line 2, on the next line add the following two lines of text:

a central processing unit;

a memory system;

--END OF EXAMINER'S AMENDMENT--

Allowable Subject Matter

6. Claims 1, 2, 5-9, 12-16, and 19-21 are allowed.

7. The following is an examiner's statement of reasons for allowance: As Applicant points out at the top of page 8, filed 12/22/06, the cited prior art taken alone or in combination fail to teach, in combination with the other claimed limitations, ensuring that the evaluation stack includes only elements related to a bytecode that may trigger garbage collection when the bytecode is executed. These limitations are present in each of independent claims 1, 8, and 15. The distinctions provided by the independent claims apply equally to all dependent claims. Thus all pending claims 1, 2, 5-9, 12-16, and 19-21 are allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

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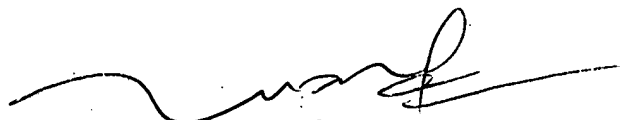
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to J. Derek Rutten whose telephone number is (571)272-3703. The examiner can normally be reached on T-F 6:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (571)272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

jdr


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